

WARNING: Read this Manual Before Operating

WARNING

You must read these operating instructions thoroughly and follow the procedures contained herein for the operation and servicing of the Prime Cut equipment to avoid serious injury or death to operator or bystanders or damage to property.

Employers must be familiar with the correct operation of this torch and provide operator training before allowing their personnel to begin using the Prime Cut equipment.

Prime Cut Ultrathermic Cutting Systems operate at a temperature of approximately 10,000 degrees Fahrenheit, enabling them to cut or melt almost any known material. Sparks, splatter and molten material generated by this process can cause fire, severe property damage, bodily injury or death.

TO AVOID SERIOUS INJURY OR DEATH:

- Never use Prime Cut Ultrathermic Cutting Systems or Rods underwater.
- Always use a 12 volt DC ignition system.
- Always wear flame or spark resistant clothing, shoes and eye and face protection.
- Always know the composition of the target material.
- Always know what is behind the target material.
- Always clear the work area of bystanders and flammable materials.
- Never point the torch at anybody.
- Always use caution when cutting overhead to avoid falling sparks, molten material and falling objects.
- Always ensure that all parts of the Prime Cut system are in good working order prior to use to avoid potential malfunction.

If you have any questions regarding the safe operation of Prime Cut systems please call:

Broco, Incorporated
8690 Red Oak Street
Rancho Cucamonga, CA 91730 U.S.A.
(909) 483-3222 Fax (909) 483-3233
Outside California call: (800) 845-7259

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Warnings and Safety Precautions

Warnings

Never use Prime Cut Ultrathermic Cutting Systems or Rods underwater.

Never use this equipment unless you are familiar with acceptable industrial welding and cutting procedures and practices.

Always use this equipment following generally accepted industrial safety procedures and practices.

Always apply and adhere to ANSI/ASC Z49.1-88 "Safety in Welding and Cutting" standards, or similar locally prevailing standards when using this equipment.

Never remove, cover or alter the warning labels attached to this equipment.

All users and their supervisory personnel must read and be thoroughly familiar with these operating instructions prior to using this equipment.

Never modify this equipment in any manner or use it in any way not specified in this manual.

Safety Precautions

WARNING Failure to heed these safety precautions may result in severe property damage, bodily injury or death.

Protect yourself and others. Fumes and gases developed may be dangerous to your health. Arc rays and spatter can injure eyes and exposed skin. Electric shock can kill.

Oxygen mixed with oil or grease reacts explosively.

The operator and all bystanders must always wear adequate protective clothing, shoes and welder's gloves when Prime Cut systems are being used.

Never operate this equipment without proper eye protection. Always use a number 5 or 6 shade filter.

Always use the Leather Shield (PC/LS) to protect yourself from sparks and spatter.

Always keep your head away from the fume plume.

Always use adequate ventilation and exhaust at the arc point to keep fumes and gases from your breathing zone and the general area. Special breathing apparatus must be used when welding or cutting galvanized, cadmium plated (or other heavy metal plated) or painted parts to avoid inhalation of toxic fumes.

Always keep the ignited tip of the rod away from the oxygen cylinder, battery and hoses.

Always use extreme caution when operating the torch in windy or adverse conditions.

Never allow falling sparks or molten metal to contact any part of the Prime Cut system. Damage may result which could render the equipment unsafe to operate.

Always keep oil and grease away from oxygen cylinders, valves, regulators, hoses and fittings.

Never clean any internal part of the oxygen system. Never use compressed air, oil, solvents or any other material to clean the oxygen system. The oxygen system could become contaminated and cause internal burning in the torch or hose. All service on oxygen delivery parts must be performed by a qualified and knowledgeable technician.

Never leave the torch unattended while the oxygen cylinder valve is open and/or there is pressure in the hose.

Never touch live electrical parts. Always wear welder's gloves when inserting the rod into the torch and/or extender. Never let the rod touch any unprotected part of your body.

SEE: American National Standard Z49.1-88 "Safety in Welding and Cutting" published by the American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

OSHA Safety and Health Standards "29 CFR 1910" available from the U.S. Department of Labor, Washington, D.C. 20210.

IN CASE OF EMERGENCY CALL IMMEDIATELY FOR MEDICAL AID.

Components

Required Equipment

- Torch Assembly
- 1/4" or 3/8" Collet
- Prime Cut UltraThermic Cutting Rods
- Leather Shield (PC/LS)
- Oxygen Regulator
- Oxygen Supply
- 12 Volt Battery Ignition System
- Protective Clothing: welding leathers, gloves and tinted eye shield.
(See Safety Precautions)

Accessory Equipment

- Battery Ignition System (PC/BIS)
- Battery Adapter Kit (PC/BAK)
- Extender (PC/XT)
- Hose/Cable Extension Kit (PC/EX-20)

Setup Procedures

Preparing the Work Area

WARNING

Never operate the torch in an explosive or flammable environment.

Never cut into unknown material.

Never operate the torch with other personnel or bystanders in front of the torch or in the immediate work area.

CAUTION

Some plastics, paints and plated parts give off toxic fumes. Organic materials may be combustible. Exotic metals may ignite. Glass and thin porcelain may shatter. Rock and minerals may spall.

1. Clear the work area of bystanders.
2. Place the oxygen supply and battery in a location away from the immediate work area.
3. Know the composition of the target material.
4. Know what is beyond the target material. Never cut near power cables, pipes, flammable objects or bystanders.
5. When the target material is a container or pipe, know the material previously contained therein. Always thoroughly purge pipelines and containers with an inert gas (such as nitrogen or argon) prior to cutting.
6. Check to see that falling material (molten metal, sparks or severed pieces of target material) will not cause injury to operator or bystanders or damage to property.

Pre-Assembly Inspection

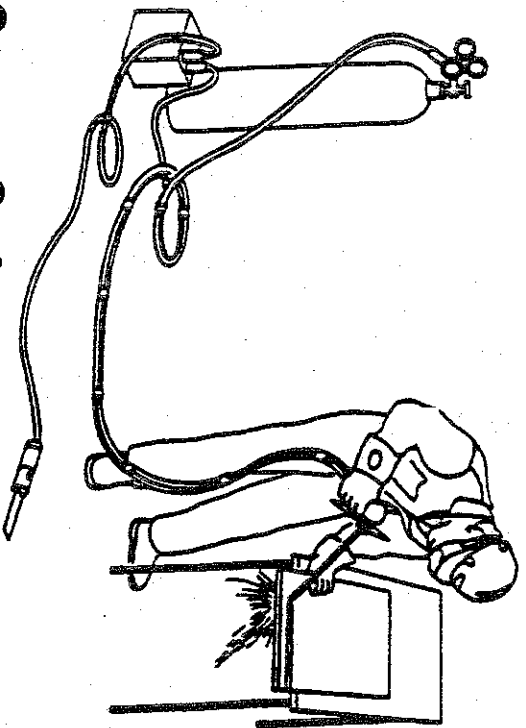
WARNING

Never use any equipment which is unsafe or appears to be unsafe. Always replace damaged or worn components to reduce the risk of injury.

Never operate the torch without the flash arrestor and flash arrestor screen in place.

1. Always inspect the oxygen hose for damage or wear prior to and immediately following each use of the Prime Cut system.
2. Always inspect the ignition power cables and connectors for damage or wear prior to and immediately following each use of the Prime Cut system.
3. Always inspect the torch for damage or wear prior to and immediately following each use.
4. Always inspect the flash arrestor and flash arrestor screen prior to and immediately following each use of the Prime Cut torch.
5. Check the battery for leaks. Never use a leaking battery.

Assembly Procedures



Oxygen System

WARNING

Never stand directly in front of or directly behind the oxygen regulator while opening the oxygen cylinder valve to reduce the risk of injury in the unlikely event of regulator failure.

Always make sure the oxygen cylinder is a safe distance from the immediate work area. Never let sparks or molten material come into contact with the oxygen cylinder.

1. Connect the oxygen regulator to the oxygen source.
2. Purge the regulator to remove debris by slightly opening the oxygen cylinder valve and turning the regulator knob clockwise until a small stream of gas escapes. Close the oxygen cylinder valve.
3. Connect the oxygen hose to the regulator.
4. Open the oxygen cylinder valve.

5. Adjust the oxygen regulator to between 10 and 80 PSI, depending on the target material and the type of work being performed. (See Table 4.1 for recommended settings).

6. Check all connections for oxygen leaks.

OXYGEN REGULATOR SETTING	APPLICATION
10-20 PSI	Piercing through hardplate
20-30 PSI	Cutting thin metal – up to 1/4" thick Piercing small bolts
30-40 PSI	Precision gouging Removal of bucket and cutter teeth Melting concrete and rock Piercing pins up to 4" in length Cutting iron and mild steel to 1/2" thick
40-50 PSI	Gouging Removing hardfacing and welds Melting concrete and rock Piercing pins over 4" in length Cutting non-ferrous material up to 1" thick Cutting mild steel 1/2"-1" thick
50-60 PSI	Cutting non-ferrous material up to 2" thick Cutting mild steel up to 2" thick
60-80 PSI	Cutting all metals over 2" thick

TABLE 4.1: Suggested oxygen regulator pressure settings for Prime Cut systems.

Ignition System

WARNING

Always use a 12 volt DC ignition system. Never use any other power source.

Always make sure the battery is a safe distance from the immediate work area. Never let sparks or molten material come into contact with the battery.

Battery Ignition System (PC/BIS)

WARNING

Never use the PC/BIS while the battery charger is plugged into an AC outlet.

Always unplug the battery charger before attaching the ignition power cables to the PC/BIS.

Never let the striker plate accidentally contact the torch, rods or work area. Electrical shock and sparks may result.

CAUTION

The battery can discharge if the striker plate continuously contacts the work area. Exercise caution to prevent complete discharge of the battery.

1. Connect the power cable from the torch to the PC/BIS by inserting the black plug into the black receptacle located on the PC/BIS. Firmly seat the plug. Twist 1/4 turn to lock in place.
2. Connect the power cable from the striker plate to the PC/BIS by inserting the red plug into the red receptacle located on the PC/BIS. Firmly seat the plug. Twist 1/4 turn to lock in place.

Battery Adapter Kit (PC/BAK)

WARNING

Never use a battery for ignition that is connected to a battery charger. Always unplug the battery charger before attaching the ignition power cables to the battery.

Never let the striker plate accidentally contact the torch, rods or work area. Electrical shock and sparks may result.

CAUTION

The battery can discharge if the striker plate continuously contacts the work area. Exercise caution to prevent complete discharge of the battery.

NOTE: Polarity does not matter for ignition since a direct short is required to ignite the rod.

1. Connect the power cable from the torch to the PC/BAK by inserting the black plug into the receptacle located in the black battery clamp. Twist 1/4 turn to lock in place.
2. Connect the power cable from the striker plate to the PC/BAK by inserting the red plug into the receptacle located in the red battery clamp. Twist 1/4 turn to lock in place.
3. Connect the battery clamps to the terminals on the battery.

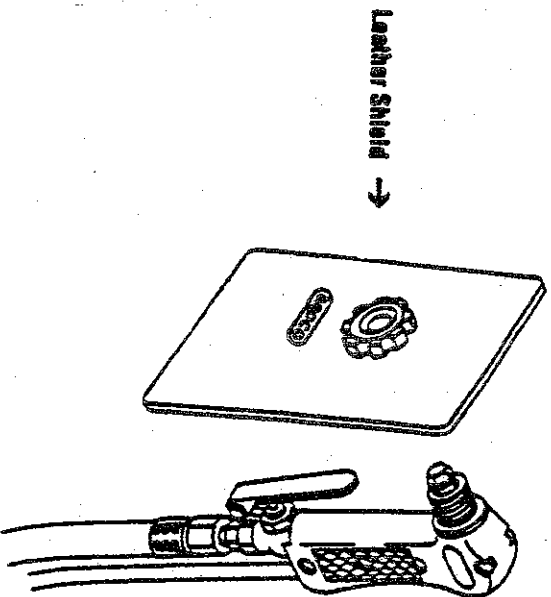
Leather Shield (PC/LS)

WARNING

Always use the leather shield (PC/LS) designed for the torch to protect yourself from spark and spatter burns.

NOTE: Make sure the PC/LS is not between the oxygen control lever and the torch handle where it would interfere with the operation of the torch.

1. Remove the collet nut from the torch.
2. With the smooth finished side of the shield facing away from the torch, slide the PC/LS onto the collet nut.
3. Screw the collet nut back onto the torch.
4. Position the PC/LS so the long end covers the oxygen control lever. (see illustration)



Rod Insertion

WARNING

Always wear welding gloves when inserting rods into or removing rods from the Prime Cut torch. Always insert the correct end of the rod into the torch.

Never use a damaged Ultrathermic rod.

CAUTION

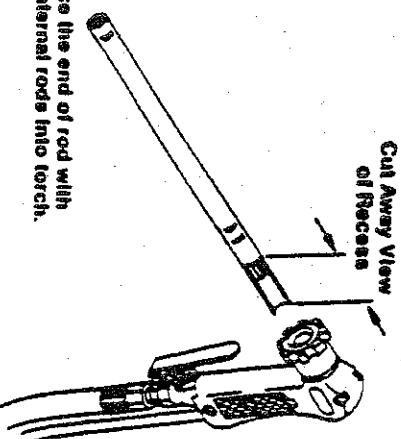
Always use Broco Prime Cut Ultrathermic Cutting Rods with the Prime Cut torch assembly. Prime Cut rods are specially designed for use with the Prime Cut torch. Never use any other rods as hazardous backlashes or internal burning may result.

NOTE: To determine the correct rod size for the target material and type of work being performed refer to Table 4.2.

1. Check to see that the collet in the torch is the appropriate size to properly fit the rod being used.

TO REPLACE COLLET:

- Remove the collet nut and collet from the torch. Make sure the Neoprene collet washer is in place. Insert the desired collet and replace the collet nut.
2. Loosen the collet nut 1/2 turn.
3. Insert the end of the rod that has the recessed internal rods into the collet until it is securely bolted out on the collet washer. (see illustration)



4. Tighten the collet nut to lock the rod in place.
5. Check for oxygen leaks at the collet nut. If a leak exists:

- Make sure the rod is firmly seated on the collet washer.
- Inspect the rod for damage.
- Inspect the collet washer for damage and replace if necessary.

ROD SIZE		APPLICATION
1/4"	3/8"	
X	X	CUTTING All steel (carbon and alloy) to 1/2" thick All steel (carbon and alloy) over 1/2" thick
X	X	PIERCING All metal up to 6" thick All metal over 6" thick Concrete
X	X	GOUGING Cracks Removing welds Removing hardfacing
X	X	

Table 4.2: Suggested rod size for various applications.

Accessory Equipment

Extender (PC/XI)

NOTE: The PC/XI is used to enable the operator to reach otherwise inaccessible places.

1. Check to see that the collet in the PC/XI is the appropriate size to properly fit the rod being used.
TO REPLACE COLLET:
Remove the collet nut and remove the collet from the PC/XI. Make sure the Neoprene collet washer is in place. Insert the desired collet and replace the collet nut.
2. Make sure the 3/8" collet is in the torch.
3. Loosen the torch collet nut 1/2 turn.
4. Insert the end of the PC/XI into the torch collet until it is firmly seated on the collet washer.
5. Tighten the torch collet nut to lock the PC/XI in place.
6. Check for oxygen leaks at the collet nut. If a leak exists:
 - Make sure the PC/XI is firmly seated on the collet washer.
 - Inspect the PC/XI for damage.
 - Inspect the collet washer for damage and replace if necessary.
7. Adjust the PC/XI handle.
 - Loosen the thumbscrew on the PC/XI handle.
 - Move the handle to a position which maximizes comfort and control.
 - Tighten the thumbscrew to lock the handle in place.
8. Insert the rod into the PC/XI as instructed in the section, "Rod Insertion".

Hose/Cable Extension Kit (PC/EX-20)

NOTE: The PC/EX-20 provides the operator with an extended usage range between the work piece and the oxygen source and battery ignition system.

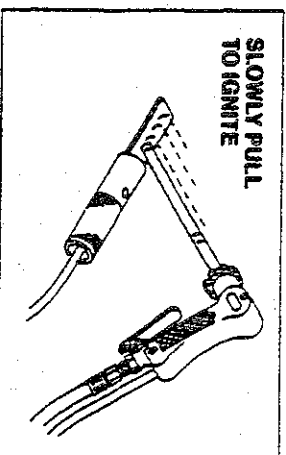
1. Connect the torch oxygen hose to the PC/EX-20:
 - Separate the two halves of the quick-connect fitting.
 - Connect the oxygen hose from the torch to the male portion of the quick-connect fitting.
 - Reassemble the quick-connect fitting.
2. Connect the power cable from the torch to the PC/EX-20 by inserting the black plug into the black receptacle located on the PC/EX-20 cable. Twist 1/4 turn to lock.
3. Connect the power cable from the striker plate to the PC/EX-20's striker plate extension cable by inserting the red plug into the red receptacle. Twist 1/4 turn to lock.
4. Follow the assembly procedures for the oxygen system and ignition system.

Operating Procedures

WARNING

Always protect yourself from spark and spatter burns. Never operate the torch without the leather shield in place.

Ignition



WARNING

Always hold the striker plate by the plastic handle to avoid electric shock. Never touch the copper plate. Never touch or hold an ignited rod.

1. Point the rod away from your body. Never point the rod at bystanders.
2. Start the flow of oxygen by lightly squeezing the oxygen control lever on the torch.
3. Bring the striker plate into contact with the end of the rod.
4. While holding the rod at a 45 degree angle to the striker plate, slowly pull the rod across the striker plate surface. (see illustration)
5. Rod sparking indicates ignition. Approximately 1-2 seconds of contact is required for ignition.
6. Maintain slight pressure on the oxygen lever to ensure complete ignition.
7. Lift the rod from the striker plate and bring it to the target material.
8. Place the striker plate in a safe location away from the work area.
9. Commence cutting, piercing or gouging according to the following directions.

Techniques

WARNING

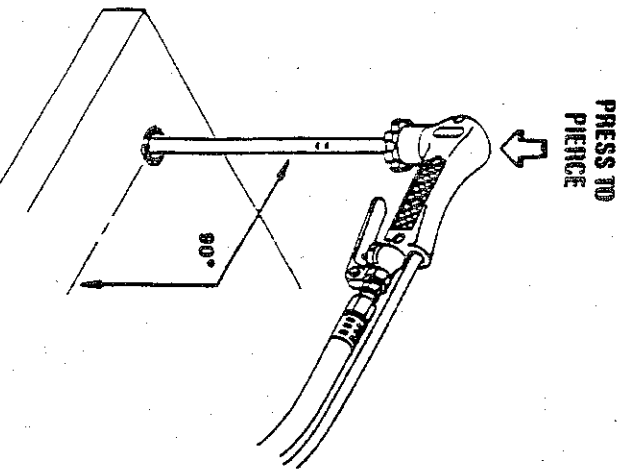
Never let the Ultrathermic rod burn down into the torch. Always release the oxygen lever to extinguish the torch while there are at least 2 inches of rod remaining.

Piercing

WARNING

Always wear adequate protective clothing and a full face shield, and use the leather shield (P/C/L/S) during piercing operations. Blowback is greater when piercing. Exercise extreme caution.

1. With the oxygen lever slightly depressed (low oxygen flow), press the burning tip of the rod against the target material at a 90 degree angle, allowing it to melt a 1/4" deep hole. (see illustration)
2. Insert the rod tip into the depression.
3. Keeping the tip of the rod in the hole, increase the oxygen flow to increase penetration by slowly depressing the oxygen lever.



4. As the target material melts and flows back out of the hole, move the rod in and out and around to enlarge the hole and allow the oxygen pressure to wash away molten material.
5. Remove the rod from the hole before releasing the oxygen lever.
6. When piercing is completed, release the oxygen control lever to extinguish the torch. The rod will continue to burn only as long as oxygen is supplied.
7. Never touch a used rod, the target material or the work surface with a bare hand until it has cooled. Always wear welding gloves.

SUGGESTIONS: Set the oxygen regulator to 35 PSI when starting piercing operations to avoid excessive blowback. When the penetration is approximately 4" deep, increase the oxygen pressure to 50 PSI.

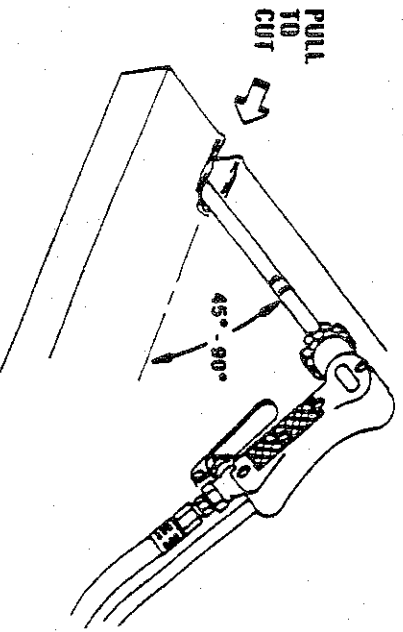
To pierce a pin 3/4" in diameter or smaller, weld a small piece of angle iron on to the head of the pin at the 3 o'clock and 9 o'clock positions to establish a rough guide. This helps to assure the production of a straighter hole. After penetrating 3-4" you can remove the angle guide and complete the hole.

When piercing a pin longer than 7", it is best to use a 3/8" diameter rod.

Cutting

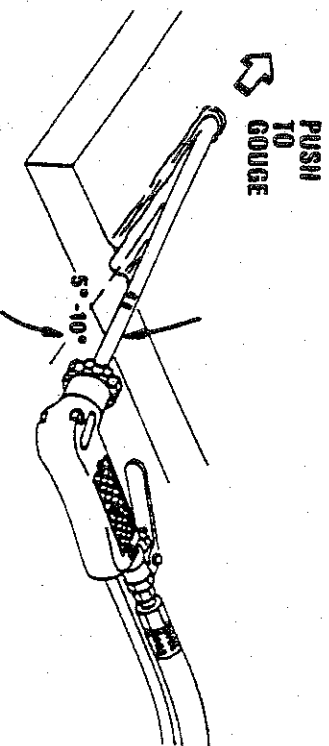
NOTE: Keep the burning tip of the Ultrathermic rod in direct contact with the target material.

1. Place the burning tip of the rod against the target material at a 45-90 degree angle. (see illustration)
2. Increase the oxygen flow by slowly depressing the oxygen lever.
3. Keep the rod tip in the cut. (see illustration)
4. Pull the rod in the direction of the cut. Be sure that the molten material is blown forward through the cut and does not splash backwards.
5. Complete the cut by making sure all the hangers are removed.
6. After completing the cut, release the oxygen control lever to extinguish the torch. The rod will continue to burn only as long as oxygen is supplied.
7. Never touch a used rod, the target material or the work surface with a bare hand until it has cooled. Always wear welding gloves.



Gouging

1. With the oxygen control lever slightly depressed (low oxygen flow), lay the rod flat on the work piece with the burning tip of the rod against the target material. (see illustration)
2. Increase the oxygen flow by slowly depressing the oxygen lever.
3. The target material will puddle in approximately 1-2 seconds. Keep the rod at a very slight angle to the work piece and the tip of the rod in the puddle.
4. With the oxygen lever fully depressed, push the rod in the direction of the desired gouge.
5. When the gouge is complete, lift the rod tip from the target material.
6. Release the oxygen control lever to extinguish the torch. The rod will continue to burn only as long as oxygen is supplied.
7. Never touch a used rod, the target material or the work surface with a bare hand until it has cooled. Always wear welding gloves.



Shutdown

NOTE: Always place a protective cap or piece of tape over the open end of the oxygen hose to prevent dirt or foreign objects from entering during storage.

1. Close the oxygen cylinder valve.
2. Depress the oxygen control lever to relieve any pressure from the oxygen hose.
3. Back-off the oxygen regulator to take pressure off the diaphragm.
4. Disconnect the oxygen hose from the regulator and cap the open end of the hose.
5. Disconnect the torch and striker plate power cables from the battery or PC/BIS.
6. Wipe down the torch assembly and striker plate assembly with a clean oil-free cloth.
7. Remove the collet nut, collet, collet washer, flash arrestor and flash arrestor screen and inspect for damage or wear. Clean and reassemble. Always replace any damaged or worn parts with factory replacement parts.
8. Always inspect the cables and hose for cuts, burns or any other signs of damage or wear.
9. Store the Prime Cut system in a clean dry place.
10. Charge the battery ignition system.

Battery Charging Instructions

Charging the Battery Ignition System (PC/BIS)

WARNING

Always disconnect the ignition power cables prior to charging the PC/BIS.

1. Plug the battery charger into a standard 110 volt AC outlet.
2. The lid must be open while charging.
3. The charger may be left plugged in. The battery will not "overcharge."
4. Unplug the charger prior to using the PC/BIS for rod ignition.

Charging the 12 Volt Battery

WARNING

Always disconnect the ignition power cables prior to charging the battery.

Read and carefully follow the manufacturer's instructions for charging the battery being used.

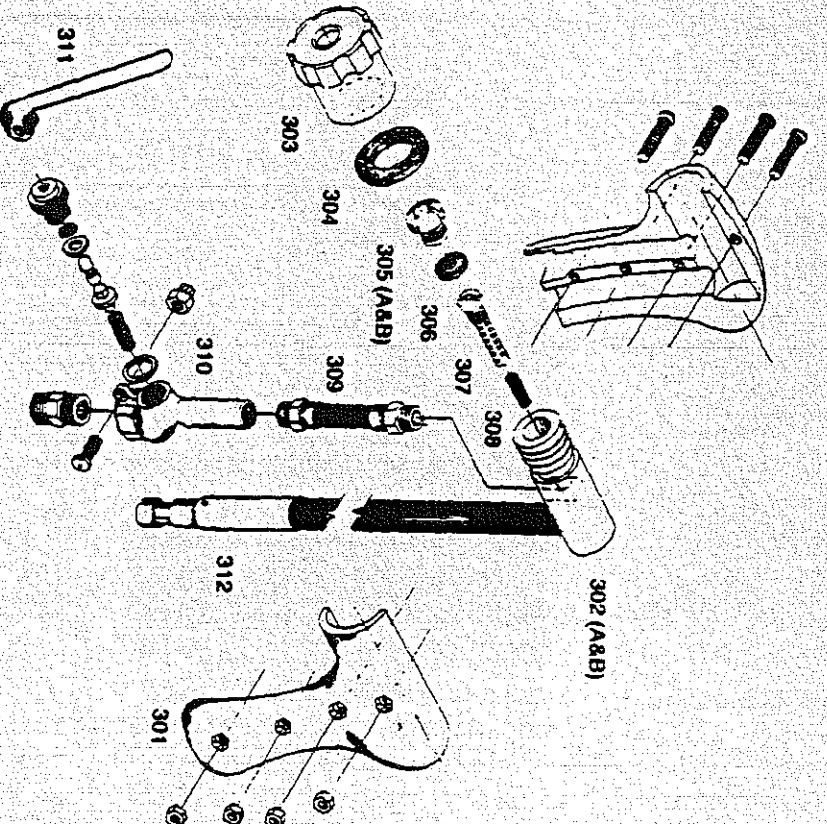
Replacement Parts

WARNING

Always use Broco factory replacement parts. Never use any other parts. Failure to do so may render the torch unsafe to operate and lead to the risk of injury or death.

REPLACEMENT PARTS LIST

ORDER NO.	DESCRIPTION
PC/RP-301	Handle Assembly Handle Grip (Right Side) Handle Grip (Left Side) Nylon Screw (5) Nylon Nut (4)
PC/RP-302A	Torch Head Assembly (15' Cable) Brass Torch Head Black Plug (PC/RP-312) Electrical Cable
PC/RP-302B	Torch Head Assembly (5' Cable) Brass Torch Head Black Plug (PC/RP-312) Electrical Cable
PC/RP-303 PC/RP-304 PC/RP-305A	Collet Nut Compression Washer (3) 3/8" Collet Kit 3/8" Collet Collet Washer (3) 1/4" Collet Kit 1/4" Collet
PC/RP-305B	Collet Washer (3)
PC/RP-306 PC/RP-307	Collet Washer (3) Collet Washer (3) Flash Arrestor Assembly Flash Arrestor Flash Arrestor Screen (3)
PC/RP-308 PC/RP-309 PC/RP-310	Flash Arrestor Screen (3) Coupler Assembly Control Valve Assembly Control Valve Body Copper Gasket Valve Stem Spring Delrin Valve Stem Neoprene Washer O-Ring
PC/RP-311	Control Valve Nut Control Valve Lever Assembly (PC/RP-311) Oxygen Hose Adapter Control Valve Lever Assembly Control Valve Lever Brass Lever Screw Brass Lever Nut Black Plug (For Torch) Red Plug (For Striker Plate) (Not Illustrated) Striker Plate Assembly (15' Cable) (Not Illustrated) Striker Plate Assembly (5' Cable) (Not Illustrated) Leather Shield (Not Illustrated)



Service and Repair

If the torch needs service or repair return it to Broco, Inc. Use of non-Broco replacement parts may render the torch unsafe to operate and lead to the risk of injury or death.

If there are any questions concerning the correct operation or care of this torch contact:

Broco, Incorporated
8690 Red Oak Street
Rancho Cucamonga, CA 91730 U.S.A.
(919) 483-3222 Fax (909) 483-3233
(800) 845-7259

Outside California call:

SERVICE AND REPAIR